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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/769,193	01/25/2001	Sungho Jin	JIN 210-33-6	4344

7590 04/10/2002
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EXAMINER

DOAN, JENNIFER

ART UNIT	PAPER NUMBER
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2874

DATE MAILED: 04/10/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/769,193

Applicant(s)

JIN ET AL

Examiner

Jennifer Doan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-37 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) ____
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ 6) ☐ Other

DETAILED ACTION

Drawings

1. The drawings, filed on 01/25/2001, are objected by the draftsman. See the attached PTO-948 form.

Specification

2. Applicants' cooperation is requested in correcting any errors of which applicants may become aware in the specification.

Double Patenting

3. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double

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patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

4. Claims 1, 4-6, 8-10, 14-19, 22-24 and 28-30 are ^{provisionally} rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 3, 7, 9, 14, 15, 20, 31, 33, 37, 39 and 41 of U.S. application serial number 09/769, 192. Although the conflicting claims are not identical, they are not patentably distinct from each other because they essentially recite the same structure of a micro-electro-mechanical device. The structure is clearly the same, and those features (of claims 1, 4-6, 8-10, 14-19, 22-24 and 28-30 of this application) which are found in claims 1, 3, 7, 9, 14, 15, 20, 31, 33, 37, 39 and 41 of U.S. application serial number 09/769, 192. The claims are therefore **not** patentably distinct.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application

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published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

6. Claims 1-4, 6-10, 15-27, 29, 30 and 34-37 are rejected under 35 U.S.C. 102(e) as being anticipated by Greywall (U.S. Patent 6,356,689).

Regarding claims 1-3, 20 and 24-26, Greywall discloses, in Figs. 4C, 4G and 7A, a micro-electro-mechanical (MEMS) device comprising a component layer (200B) having a frame (414) (column 6, lines 28-32) and one movable component (420 and 720); an actuator layer (202A) having one conductive path (204A) and one actuator for moving the component (column 5, lines 30-33 and column 9, lines 45-65), the component and actuator layer have a mesa configuration and facing surfaces, each has a planar configuration (Fig. 4G); one spacer (G) to separate the component layer (200B) and the actuator layer (202A) by a vertical gap spacing; one resilient member (416) coupled to the component layer (200B) and the actuator layer (202A), wherein the component layer, spacer and actuator layer are held in laterally aligned and vertically spaced relation by resilient force as shown in Fig. 4G.

Regarding claim 4, Greywall discloses the component layer, the spacer and the actuator layer are laterally self-aligned by alignment slots (column 5, lines 52-62).

Regarding claims 6, 34-37, see Figs. 4G and 7A for the component is a mirror (420 and 720); wherein an improved optical power gain equalizer system for dynamically reducing the variation of optical signal strength, and improved wavelength

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division multiplexing telecommunication system, an improved light signal switch for an optical telecommunication system and an improved variable optical attenuator for an optical telecommunication system comprising a MEMs device.

Regarding claim 7, the actuator layer has a mirror image (410, Fig. 4G).

Regarding claims 8-10, 15, 29 and 30, Greywall discloses the MEMs device comprising the component layer (200B) comprises single crystal silicon (column 2, lines 64-65 and column 4, line 7), polycrystalline silicon (column 11, lines 5-9); wherein the component is a mirror (420) comprising a coating of metal (column 10, lines 64-66 and column 11, line 20); further wherein a transparent plate is disposed overlying the component layer as shown in Fig. 4G.

Regarding claims 16 and 17, Greywall discloses the spacer (G) including walls defining a cavity below the component (200B) and the walls are conductive to isolate the component (200B) and cover the peripheral area around the cavity as shown in Fig. 4G.

Regarding claims 18 and 19, Greywall discloses the resilient member is coupled to the component layer or the actuator layer by bonding (column 6, lines 52-62 and column 7, lines 29-38).

Regarding claim 21, Greywall discloses a frame (414, Fig. 4G).

Regarding claim 22, wherein the resilient member is hermetically sealed to the actuator layer (column 6, line 65).

Regarding claim 23, Greywall discloses the resilient member is hermetically sealed to the actuator layer and the transparent plate to hermetically package the MEMs device (Fig. 7A and column 6, line 58-65).

Regarding claim 27, see Fig. 7A of Greywall for the component layer comprising a plurality of components including movable mirrors (720).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102((e), f) or (g) prior art under 35 U.S.C. 103(a).

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9. Claims 5, 11-14, 28, 31-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Greywall as cited above.

Greywall discloses the claimed invention except for the spacer aerodynamically isolating the mirror by blocking at least 20% of the peripheral area underlying the component as recited in claims 5 and 28. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to employ the spacer aerodynamically isolates the mirror by blocking at least 20% of the peripheral area underlying the component, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Greywall discloses the claimed invention except for the spacer having a coefficient of thermal expansion (CTE) different from the component layer and the actuator layer by not more than 50% as recited in claims 11 and 31. On the other hand, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the spacer having a coefficient of thermal expansion (CTE) different from the component layer and the actuator layer by not more than 50%, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Greywall discloses the claimed invention except for the spacer comprising a material selected from the group consisting of Si, Mo, W, Zr, Hf, Ta, Fe-Ni alloys or Fe-Co-Ni alloys as recited in claims 12 and 32. Nevertheless, it would have been obvious to one having ordinary skill in the art at the time the invention was made to employ the

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material selected from the group consisting of Si, Mo, W, Zr, Hf, Ta, Fe-Ni alloys or Fe-Co-Ni alloys to make the spacer, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Greywall discloses the claimed invention except the range of resilient coupling is at least 5 micrometers as recited in claim 13. Nonetheless, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the range of resilient coupling is at least 5 micrometers, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Greywall discloses the claimed invention except for the spacer comprising of ferromagnetic material as recited in claim 14. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to employ the spacer comprising of ferromagnetic material, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Greywall does not disclose the assembly being performed at ambient temperature as recited in claim 33. However, it is considered to be obvious since the ambient temperature would be the desirable temperature for a person of ordinary skill in the art to perform the assembly. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to complete the gathering of

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Greywall's device at ambient temperature. Doing so would achieve the effective MEMs device to obtain the high switching capacity.

Conclusion

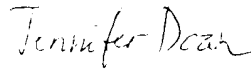
10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Fouquet et al. (U.S. Patent 6,055,344) show methods of fabricating switches in which optical coupling among waveguides is determined by manipulating fluid. McClelland et al. (U.S. Patent 6,201,629) show a micro-mechanical mirror system. Zhang (U.S. Patent 6,229,640) shows an apparatus and methods of manufacturing microelectromechanical optical switches. Bhalla et al. (U.S. Patent 6,275,326) also show microelectromechanical optical switches. Tilmans et al. (U.S. Patent 6,297,072) show product and method of fabricating of a microstructure. Aksyuk et al. (U.S. Patent 6,351,577) show micromachined tunable optical filters. And Couillard (U.S. Patent 6,360,036) shows a MEMs optical switch.

11. Any inquiry concerning the merits of this communication should be directed to Examiner Jennifer Doan whose telephone number is (703) 308-6179. The examiner can normally be reached on Monday to Thursday from 6:30am to 4:00pm, second Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick, can be reached on (703) 308-4819. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7724.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



Jennifer Doan

Patent Examiner

April 5, 2002

